Slide 1 – Intro

- We explored the wide ranging field of information design last week – remember, this terminology refers to a breadth of endeavours
- Depending on specificity of audience and density of information (and context) information can be serve many functions
- Today we are going to explore the backstory of information design and the 'building blocks' that have set the stage for the ascent of visualization over the last decade

Slide 2 – Advance of Data Civilization

- To get this conversation started, a great recent resource is a post from Stephen Wolfram's research blog entitled 'Advance of the Data Civilization'
- Who is Stephen Wolfram?
- What is his current project?
- British scientist and chief designer of Mathematica – computational engine for problem solving (1988-)
- Wolfram is a bit of an intellectual iconoclast, produced a significant paper on quark production (physics) at 18 and eight others while floating around three universitiies. He ended up receiving a Ph.D. in particle physics at 20 and received a MacArthur award at 21.
- Studied cellular automata (generative computational systems) – show Conway's game of life for context: http://www.bitstorm.org/gameoflife
- Authored "A New Kind of Science" in 1992 – advocating for empircal study of rudimentary computational systems.
- Wikipedia: "Wolfram's conclusion is that the universe is digital in its nature, and runs on fundamental laws which can be described as simple programs" – and predicted revolutions across disciplines as this became evident
- Since 2009 – he's been working on Wolfram Alpha "an answer engine" – that merges the search paradigm with computational problem solving
- Watch video contextualizing that project: http://youtu.be/94HOrSA6GrA

Slide 3-4 – Timeline

- Navigate to http://www.wolframalpha.com/docs/timeline
- While you were asked to read the short blog post, it is important you all spend a bit of time navigating this 'laundry list' of significant developments that preceded our current knowledge culture
- What were your thoughts on the overall tone of the article? How does it reflect Wolfram's thinking and computational engine?
- Would you agree as to the importance Wolfram has assigned these developments?
- I would describe Alfram's interest here in identifying examples of systematization that have had profound cultural implications, and then thinking about when they've occurred (over the course of history).

Slide 5 –Wolfram bar graph

- This image is bar graph plotting advances by century/geography
- Note the frequecy of developments in the 20th century and how much innovation has occurred in America
- Wolfram describes much of this history as 'back room' history that sits outside traditional historical narratives

Slide 6 – Misc. Achievments in human history

- Spend 15-20 minutes discussing significance of these 'metrics' and their importance culturally
- Ask group to be mindful of what other advances these metrics facilitated

Slide 7 – Cave Painting

- What Wolfram underscores is that quantiative thinking is tethered to a long procession of cultural developments.
- To provide some additional context, it would be worthwhile to draw on a few points from the third chapter of the Information Design Handbook text
- This history of information design is directly tied to history of visual culture

Slide 8 – Pictographic Writing

- Genesis of information design is in visual langauge – that preceded the 'written word' as a means to "share ideas, beliefs and experiences"
- Pictograms were imprinted on tokens (used in commerce) and later imprinted on tablets for agriculture, trading and to record debts

Slide 9 – Early Cartography

- Might seem like an obvious questions, but how does cartography help prefigure information design?
- Cartography was traditionally tied to defining empire, advancing navigation and geometry, and helped spurn the need for more advance measuring tools
- "The Romans created accurate maps of newly conquered lands to manage the construction of roads and property rights for their vast empire. Renessance cartographers created highly detailed charts depicting coastlines, ports, geographic hazards and wind directions. Advances in measurement and production technology led to more detailed maps with denser information resolution and greater representational accuracy" IDH pg. 30
- If you were to look at a procession of maps from over the centuries, you'd have not only a history of geography, but science, math, visual communication, etc. – yes it is patently obvious, but worth mentioning.

Slide 10 – William Playfair (1759-1823)

- Father of charts/graphs – this example is one of the first pie charts ever produced. Measures territory, population and revenue of various nations in Europe.
- These interests make Playfair's vocation clear – he was a political economist (also had education in engineering)

- Published two major works "The Commercial and Political Atlas" (1786) and The Statistical Breviary (1801)
- Made the transition from representing data in tables to line graphs, bar graphs and pie charts to "help reader gain an improved understanding of quantities relative to another and to see economic patterns over time"
- These representations increased accessibility

Slide 11 – Imports/Exports Line Graph
- (Practically) ground zero for line graphs – 1785
- Trade balance in England over times
- What do you think about the legibility of this image?
- Not exactly machine precision! But still, very clear compared to a table

Slide 12 – Monarchy Graph
- More sophisticated graphic by Playfair – illustrates prices, wages, and reigns of Britsh Royalty
- What observations could we make about the monarchs pictured in this image?

Slide 13 – Charles Minard (Cattle Yield Map)
- French Civil Engineer who lived from 1781-1870
- Superintendent of Bridges and roads in the 1830s – later a private researcher

Slide 14 – The Minard Map
- If we think Edward Tufte is the ultimate authority on information graphics – spoiler alert: this is the best statistical graph we'll see all semester
- Before I get into specifics of this image – I'd like to show a brief video to set the stage for contextualizing it

Slide 15 – Napoleon
- Up until 1812, Napoleon was the dominant force in Europe with an empire that covered much of the continent – an ongoing dispute with Russia saw him assemble a massive army (of up to 500,000) and march eastward.
- Show http://youtu.be/458Gw-Xw0u0

Slide 16 – Minard Map (again)

Selection from Tufte: "…which shows the terrible fate of Napoleon's army in Russia. Described by E.J. Marey as seeming to defy the pen of the historial by its brutal eloquence, this combination of data map and time-series, drawn in 1861, portrays the devastating losses suffered in Napoleon's Russian campaign of 1812. Beginning at the left on the Polish-Russian border near the Niemen River, the thick band shows the size of the army (422,000 men) as it invaded Russia in June 1812. The widht of the band indicates the size of the army at each place in the map…The path of Napoleon's retreat from Moscow is depicted by the darker, lower band, which is linked to the temperature scale and dates at the bottom of the chart"

- Discuss quote about graph "defying the pen of the historian" – what is inferred here?
- What are your thoughs about how this graphic communicates space and time?
- Have you ever seen any other graphics like this? If so, what?

Slide 17 – Morse Code

- A lot is obviously going on in the mid 19th century, it is worth highlighting the telegraph/development of morse code in particular as a harbinger of the digital age.
- What was the significance of the Telegraph?

Two quotes on the Telegraph courtesy of Marshall McLuhan:

1. The telegraph… is not the mechanization of writing but the electrification of writing. (1960)
2. The telegraph had already created new forms of the printed word, in the newspaper and in poetry alike. By making it possible for information to be gathered simultaneously from every quarter of the globe, the telegraph press took on a mosaic and essentially acoustic character of simulatneity that occurred in symbolist poetry as well. (1974)

- Telegraph profoundly affected not only communication, but geography. It changed the (way we experience and manage) landscape.
- Intangible counterpoint to the rail lines criss-crossing the continents

Slide 18 – Snow Map

- Another important precedent from the same era that suggested the possibliity of an 'expanded' cartography is this image – the snow map.
- Are any of you familiar with this map?
- John Snow was a physician who lived from 1813-1858
- In 1854 there was a significant cholera outbreak in London – at that time the prevailing theory as to how that disease was spread was via "bad air" (germ theory was approximately a decade away from breaking)
- Snow did not believe that air was responsible for the transmission of the disease and through conversations with the local community, he was concinced the spread of the disease was tied to a specfiic public water pump – so he set out to map the location of various individuals affected with the ailment.

Slide 19 – Snow memeorial

Excerpt from letter he wrote to Medical Times and Gazette

"On proceeding to the spot, I found that nearly all the deaths had taken place within a short distance of the [Broad Street] pump. There were only ten deaths in houses situated decidedly nearer to another street-pump. In five of these cases the families of the deceased persons informed me that they always sent to the pump in Broad Street, as they preferred the water to that of the pumps which were nearer. In three other cases, the deceased were children who went to school near the pump in Broad Street...

With regard to the deaths occurring in the locality belonging to the pump, there were 61 instances in which I was informed that the deceased persons used to drink the pump water from Broad Street, either constantly or occasionally...

The result of the inquiry, then, is, that there has been no particular outbreak or prevalence of cholera in this part of London except among the persons who were in the habit of drinking the water of the above-mentioned pump well."

- It turns out this well was dangerously close to a cesspit.
- If you are interested, the author Steven Johnson dedicated an entire book (*The Ghost Map*) to considering how John Snow's is a tale of urbanism. Here is a video where he discusses the significance of the map: http://vimeo.com/266642
- What are your thoughts on Johnson's comments that the map 'emerged from a community'? This is a conversation we'll come back to repeatedly this semester, but we'll outright focus on it on when we discuss 'spatial relationships'

Slide 20 – Mundaneum

- As we shift our attention to the 20th century, it would be most useful if we stepped away from maps to examine some broader cultural trends the first of which is Paul Otlet and Henri La Fontaine's 'Mundaneum'
- Duo had worked on a 'universal bibliography' extended that initiative into the realm of architecture.

Described in Gerlinde Schuller's *Designing Universal Knowledge*: "Developed for the 1910 World Fair in Brussels. An archive of 12 million, 76 x 127 mm standardized index cards, ordered according to the Universal Decimal Classifcation (developed by Otlet/La Fontaine)… The Mundaneum wanted to gather the knowledge of the world in an all-encompassing knowledge storage that was part of the Global Polis, an international 'city of the intellect' designed by the architect Le Corbusier" Pg. 174.

In Otlet's own words "Cinema, phonographs, radio, television: these instruments, taken as substitutes for the book, will in fact become the new book, the most powerful works for the diffusion of human thought. This will be the radiated library, and the televised book"

- Project proposed an 'electric telescope' and hypertext like 'links' – prefigured the relational database and the Memex.

Slide 21 – Memex

- My personal favourite precursor of the web and the information age, Vannevar Bush's Memex.

"A memex is a device in which an individual stores all his books, records, and communications, and which is mechanize so that it may be consulted with exceeding speed and flexibility. It is an enlarged initimate supplement to his memory. What does it consist of? It consists of a desk. Presumably, it can be operated from a distance, but it is primarily a piece of furniture at which an individual works. – "Memex Revisited"

Slide 22 – Cultural Analytics

- Early 20th century, we start to see metrics being used to quantify public opinion.
- Nielson ratings – used viewer diaries and later set meters – used to monitor trends by demographic.
- Gallup Polls launched in 1935, have served as a cornerstone of public opinion sampling ever since. Publish trend analysis – early form of what we might describe as 'data driven news' – terminology that we'll return to towards the end of the semester

Slide 23 – Eames Office

- No discussion of information design would be complete without prominent mention of architects turned multidisicplinary designers Charles & Ray Eames
- Active across many mediums including architecture, industrial & furniture design, film, and exhibition design
- ….this image is from an exhibition called *Mathematica: A World of Numbers and Beyond*.

Described in the *Information Design Handbook* as follows: "Approached by the IBM corporation to design for the California Museum of Science and Industry, the Eameses created a 3,000 square foot exhibit that epxlained heady mathematical concepts using graphic displays and interactive experiences. Central to their theme was the notion that math could be fun. Nine ineractive displays demonstrated the laws of probability, multiplication, celestial mechanics, and other complex topics. The Eamses engaged museumgoers by creating interactive spaces that required visitor participation. In the Probability Machine, for example, a button pressed by the patron would cause 30,000 plastic balls to fall into a screen and create a bell curve"

- The History wall is a timeline that shows visualizations of mathematical theories

Slide 24 – Powers of Ten (1976)

- Screen http://youtu.be/0fKBhvDjuy0
- Discuss how it represents scale

Slide 25 – Mark II

- Mid 20th century were were seeing proliferation of early computing power.
- Vannevar Bush's memex was no longer a pipe dream and we'd see computation begin to creep into first the military, then business and then personal/creative culture in the coming thirty years.
- If this particular trajectory of interest to you, would direct your attention back to Wolfram's timeline

Slide 26 – Wurman quote

- Refresher of last week's cryptic quote on the essence of information design
- Architect, graphic designer and created the TED conferences – mainly active as an (extremely prolific) publication designer but has influenced the direction of information architecture as a field more than any other individual

Slide 27 – Wurman interview

- Play http://dsc.discovery.com/videos/curiosity-richard-saul-wurman-information-architecture.html
- Information design is interdisicplinary! Point group at http://192021.org

Slide 28 – Present Day

- We could endlessly split hairs after the 1980s, would like to leave this backstory open ended an instead discuss the readings for the week.
- Discuss "Graphical Excellence" in Tufte and "Telling Stories with Data" in Yau